

# Snowmass HEP Meeting 2022

## Status of the NQI and Quantum Industry of the Future

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# Goals of the National Quantum Initiative

- Add significant federal support for QIS
- Build on long history of efforts from NSF, NIST and DOE
- Additional financial support in three verticals:
  - Additional university support (NSF)
  - Commercial/industrial consortium (NIST)
  - Focused R&D centers each with breadth of participation (DOE)
    - First large-scale participation of private sector in DOE SC research
- Trigger additional interest and investment
- National coordination of future Q efforts (aka NQI Advisory Committee, OSTP)

# Status of the NQI Efforts

- Quick and full support from Congressional appropriations
- Derivative efforts spawned: Quantum Internet Blueprint
- All three agencies quickly executed their verticals
- High continued interest from all sides in Congress
- Jury still out:
  - Broad Community building
  - Science & technology achievements from the centers
  - Impact of NSF and DOE efforts on commercialization impact
  - New Administration projects
  - Potential “national projects” for quantum. I.e first advantage QC, first quantum networks, quantum satellite communications, etc.

# Status of the Quantum Tech Community

- Explosion of lab, academic and commercial efforts
  - Expansion of university degree programs (aka UChicago, Harvard, etc.)
  - Massive private capital investment (but under risk due to recent economic challenges)
  - Private companies now under the focus of investors to deliver in a timely manner.
    - QC companies making promises on the timing of their “advantaged QC’s”
  - Competition pushing global investment
- Greater awareness by the political community of the impact of discovery science on Industries of the Future and national security (key issue for broader HEP support)

# Future Government/Lab-Academia-Private Sector Quantum Partnership

- Need to continue to bridge the gap between research, first quantum products, and users. Still much larger than most technologies
- While still pushing the science, it is imperative for first generation commercial products to deploy, or else governments and private sector support will pivot away
  - This happened for energy tech in the 2000's; it killed investment for a decade
- Government should be a first-purchaser, like it was for other first technologies (internet, nuclear power, etc.)
  - QC's or heterogeneous HPCs with QPUs should be purchased by national labs or DOD
  - First metro-area q-nets should be built by DOD, DOE and/or NSF
  - DOD and/or NASA should deploy a first U.S. q-comms satellite
- U.S. should accelerate collaboration with allied nations on quantum
  - Cooperation agreements are not sufficient; specific joint programs need to be structured and executed